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<p>(71) Patent Proprietor: NSM AG, 55411 Bingen, DE</p> <p>(74) Representative: Becker, B., Dipl.-Ing., Patent Attorney, 55411 Bingen</p>	<p>(72) Inventors: Pickhardt, Hans J., Dipl.-Ing., 55411 Bingen, DE; Schattauer, Jürgen, Dipl.-Math., 55583 Ebernburg, DE; Heinen, Horst, 55411 Bingen, DE</p> <p>(56) Printed Documents Considered for the Assessment of Patentability: DE 31 01 937 A1 DE-GM 19 33 352 DE-GM 17 92 248 EP 01 42 371 A2</p>
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(54) Coin-operated Gaming Machine

## Description

The invention relates to a coin-operated gaming machine which offers the  
5 prospect of a win and comprises a plurality of rotatable members which are  
provided with symbols which determine a win or a loss and are associated with  
display windows, and a microcomputer, fitted with a random generator, for  
controlling the entire course of a game.

A wide variety of such coin-operated gaming machines are known. They  
10 mainly have three rotatable members, which may be in the form of rollers or in  
the form of discs. The rotatable members have winning symbols on their surface  
which can be perused through display windows from outside. The rotatable  
members are generally stopped in succession and, after all of the members have  
stopped, the combination of symbols appearing in the display windows  
15 determines a win or a loss. This is apparent from a winning diagram provided on  
the front panel of the gaming machine. Specific combinations of symbols give rise  
to a plurality of so-called special games. To increase the chances of winning,  
these special games are games where higher pay-outs are expected in the event  
of a win.

20 Various measures have already been taken to induce a player to use such  
gaming machines, and to entertain him also during the course of the game and to  
provide him with inducements to continue playing. Many of these gaming  
machines are provided with control means for the player to use, e.g. buttons,  
levers and knobs. These operating means generally affect the movement of the  
25 individual rotatable members. In consequence, the player may be placed in a  
position where he can start one or a plurality of the rotatable members by  
operating such an operating means, e.g. a starting button, whereby the player is  
given the opportunity of actually influencing the events of the game. Stop buttons  
are also provided to enable the player to hold a rotatable member when it rotates,  
30 thereby giving the player the impression that he can influence the events of the  
game and, hence, the combination of symbols which result during the game.

Further inducements to play are provided by panels having win-indicating  
means which are accordingly illuminated upon the achievement of a

predetermined win. To achieve a greater win, in particular during the special games, it is necessary to play numerous games. In order to make the game more varied, means for introducing risks in the game have been developed which permit the player to increase the already attained win at the risk of losing. In  
5 addition, gaming machines are known which permit the attainable win to be increased without the player suffering any losses.

With modern gaming machines which are on the market today, the entire course of the game – including determining the win and paying-out the win – is electronically controlled by means of a microcomputer which contains a program  
10 corresponding to the particular course of the game. A so-called random generator is associated with the microcomputer in order to exclude any mathematical interrelationship in determining wins of subsequent games, so that each result of a game is dependent on chance. At the very outset of the rotational movement of each individual rotatable member, the random generator actually determines the  
15 symbol which forms a part of the combination of symbols that will eventually form, and stops the rotatable member when this randomly determined symbol is in the result position. The control buttons are also linked to the microcomputer and, by operating the control buttons, the player is able to influence the course of the game as he wants, so that the rotatable members can be restarted or  
20 prematurely arrested in known manner in order to give the player the customary entertainment value.

A gaming machine of the kind mentioned initially is known from EP 0 142 371 A2. Furthermore, DE-GM 19 33 352 shows a coin-operated gaming machine with a plurality of concentric, rotatable disks, which are provided with  
25 symbols and are held on a common axis. Further, DE-GM 17 92 248 discloses a gaming machine in which each rotatable member is designed as an arrow rotating in front of symbols, wherein the arrow may be set, during the course of a game, to different positions, one after the other, wherein the individual results indicated thereby are continuously accumulated and the result is transferred to a  
30 display. Finally, DE 31 01 937 A1 discloses a gaming machine in which the symbol panels are fixedly arranged on a circle-shaped curve and can be illuminated by a dot of light that can be switched step by step.

The object of the invention is to make, in a gaming machine of the kind mentioned initially, the course of the game and the possibilities of winning more varied with greater inducements to play in order to increase the entertainment value for the player.

5           According to the invention, this object is achieved by providing, as further rotatable members, a rotatable disc which is marked with different winning panels, wherein an arrow is oppositely rotatable around the disc around a common axis of rotation, the disc and the arrow having the same number of snap-in positions, and by providing that, upon the occurrence of a predetermined  
10 combination of symbols of the rotatable members in the display windows, the disc and the arrow are rotatable, and are stoppable virtually simultaneously by pressing a stop button, and then the win, indicated on the disc by the arrow, is awarded.

          Due to this arrangement of the gaming machine, the player can clearly  
15 see, when the disc is in its resting state – as is mainly the case – what additional wins he can achieve with the occurrence of a predetermined combination of symbols. If this combination of symbols now occurs the disc is set in rotation and, at the same time, the arrow begins to rotate in the opposite direction. In this case, the player can no longer see what win is in what position. The player may then  
20 use the stop button to hold the arrow in any position he wants. The disc also stops when the arrow stops. The arrow now points to the attained winning panel of the disc, and the win marked in this winning panel is now given. Consequently, the excitement of the player is constantly increased by the subsequent events which may occur within a game in connection with the interplay between the disc  
25 and arrow, with the result that the inducement to play is also increased.

          In an embodiment of the invention, the speed of rotation of the circular disc is greater than the speed of rotation of the arrow pointing to the disc. The relatively slow movement of the arrow permits the arrow to be stopped at the desired arrow panel by means of skill, while the relatively rapid movement of the  
30 disc permits a virtually simultaneous stopping with the disc.

          So that the player can achieve special games with a chance of winning in excess of normal play, in addition to the legally prescribed maximum amount of money winnings, a further development of the gaming machine according to the

invention provides that the winning panels of the disc, which are disposed adjacent one another in a sector-like manner, are selectively marked with wins in respect of special games or money. Consequently, the player has the chance of achieving special games or a money win by arresting the rotating arrow  
5 accordingly.

So that the arrow rotates in a simple and wear-free manner from the point of view of design, according to an advantageous further development of the subject-matter of the invention, the disc is surrounded by illuminatable arrow panels which are associated with the individual winning panels of the disc,  
10 whereby, in order to simulate the rotating arrow – proceeding from an arrow panel which forms a starting panel – the subsequent arrow panels can be illuminated in succession. In such a case, in order to increase the entertainment value, the starting panel for the rotational movement of the arrow is advantageously selectable from the arrow panels, as desired, by means of a button.

15 An additional, attractive arrangement of the gaming machine according to the invention is such that, depending on the occurrence of different combinations of symbols of the rotatable members in the display windows, a variable number of arrows are illuminated in the arrow panels, such arrows simultaneously rotating in a direction opposite to that of the rotating disc due to a step-wise sequence of  
20 illuminating the subsequent arrow panels and, after they and the disc have stopped, the arrows mark a corresponding number of winning panels on the disc, the wins indicated by the winning panels being allowable as the total winnings. Consequently, the more arrows the player obtains, the higher is his chance of achieving maximum winnings. The variable number of arrows supplied causes  
25 the player to pursue the course of events in the game with interest, and consequently the player is offered considerable entertainment value. Preferably, when a predetermined combination of symbols occurs, two opposed arrows are illuminated in the arrow panels and, when another predetermined combination of symbols occurs, four arrows which are disposed in a cross-like arrangement  
30 relative to one another are illuminated in the arrow panels.

The invention will be described further in the subsequent description, by way of a sample embodiment, which is shown in the drawings. The drawings show:

**Fig. 1** a perspective, front view of a gaming machine according to the invention;

**Fig. 2** an enlarged detailed view of the disc and its associated circle of arrows as illustrated in **Fig. 1** but with two arrows set;

5        **Fig. 3** an enlarged, detailed view of the disc and its associated circle of arrows as illustrated in **Fig. 1**, but with four arrows set; and

**Fig. 4** a block diagram showing the principle of the circuit structure of the gaming machine of **Fig. 1**.

The gaming machine **1** has three roller-like rotatable members **2, 3** and **4**  
10    which are each provided with a number of symbols for denoting a win or a loss. Only the particular portions of the rotatable members **2, 3** and **4** situated inside the display windows **5** in the front panel **6** of the housing **7** are visible. Two display windows **5**, which are disposed one above the other, are associated with each of the two outer rotatable members **2** and **4**, while the central rotatable  
15    member **3** is merely provided with one display window **5**. After the members **2, 3** and **4** have stopped, the combination of symbols determining a loss or a win appears in the display windows **5**. A coin indicator **8** and a special game indicator **9** are provided in the form of electronic displays below the three rotatable members **2, 3** and **4**, and they indicate the amount of money in credit and the  
20    current number of special games. A coin slot **10** and a coin return button **11** are disposed above the rotatable members **2, 3** and **4**. A pay-out tray **12** and a control button **13**, which is used to influence – i.e. restart and stop – the individual rotatable members **2, 3** and **4**, are provided in the lower region of the gaming machine **1**.

25        Furthermore, a circular disc **15**, which is rotatable about an axis **14**, is disposed in the front panel **6** between the rotatable members **2, 3** and **4** and the pay-out tray **12**. The visible front surface of the disc **15** is divided into sector-like winning panels **16** which are disposed directly adjacent one another. The individual winning panels **16** are marked with the number of special games which  
30    can be achieved, four, ten, twenty or twenty-five, respectively. Naturally, the winning panels **16** may also be marked with money winnings up to the maximum legally permissible limit. A circle of arrows **17**, formed from illuminatable arrow panels **18**, surrounds the disc **15**. Each arrow panel **18**, which points to the disc

**15**, is centrally associated with a predetermined winning panel **16**, i.e., the number of arrow panels **18** corresponds to the number of winning panels **16**. To simulate an arrow **19** rotating around the disc **15**, an arrow panel **18**, which serves as a start panel **20**, is illuminated, and subsequently the following arrow panels **18** are illuminated in a stepwise manner in the direction of arrow **21**; the disc **15** is simultaneously rotating in the direction of arrow **22**. The start panel **20** of arrow **19** may be freely selected by means of a button **23** situated next to the pay-out tray **12**. By utilizing a stop button **24** which is provided next to the button **23**, it is possible to stop the rotating arrow **19** within the circle of arrows **17** in a desired arrow panel **18**, wherein the disc **15** stops rotating at the same time.

If three identical DM symbols appear next to one another in the display windows **5** – one of these symbols being shown in the upper display window **5** of the left-hand member **4** in **Fig. 1** – then the DM amount associated with these symbols is won and is indicated in the coin indicator **8**. If, however, a combination of three identical special symbols of a first type appears in the display windows **5**, special games may also be won in addition to a sum of money, and such games are indicated in the special game indicator **9**. Special games offer the player a greater expectation of winning in that predetermined symbols on the central member alone will already produce a win of 3 DM. If a predetermined combination of special symbols of a second type appears – such as three figures "7" next to one another on the members **2**, **3** and **4**, for example – the arrow **19** in the starting panel **20** is set in the circle of arrows **17**. The player may then shift the starting panel **20** of the arrow **19** within the circle of arrows **18** for a certain period of time. Subsequently, the disc **15** is set in rotation in the direction of arrow **22**, and the arrow **19** is set in rotation in the direction of arrow **21**, the speed of rotation of the disc **15** being greater than the speed of rotation of the arrow **19**. By means of the stop button **24**, the player may now hold the arrow **19**, which rotates, through illumination, from arrow panel to arrow panel, on any arrow panel **18** he may want, and the disc **15** is stopped at the same time. The arrow **19** now points to a predetermined winning panel **16** of the disc **15**, and the special games indicated there are now won.

Upon the appearance of four special symbols of the second type in the display windows **5**, i.e. upon the appearance of four figures "7" in the display

windows 5, two opposed arrows 19 are set in the circle of arrows 17, as illustrated in Fig. 2. The two arrows 19 rotate simultaneously in a direction opposite that of the rotating disc within the circle of arrows 17. After the arrows 19 and the disc 15 have stopped, the arrows 19 point to two winning panels 16 of the disc 15, and the special games indicated there are added together and consequently allowed as the total winnings.

In the illustration of the disc 15 and its associated circle of arrows 17, as shown in Fig. 3, an arrow arrangement comprising four arrows 19, which are disposed in a cross-like arrangement relative to one another, is set in the circle of arrows 17. The four arrows 19 are then given when, after the rotatable members 2, 3 and 4 have stopped, five special symbols of the second type appear in the display windows 5, i.e. in the present case, the figure "7" can be seen five times in the display windows 5. After the four arrows 19 in the circle of arrows 17 have finished rotating, and after the disc 15 has stopped, the four arrows 19 point to four associated winning panels 16 of the disc 15. The number of special games shown on these four winning panels 16 is added up and indicated to the player as total winnings. Consequently, with four set arrows 19 the player can achieve the maximum number of special games offered by the disc 15.

The gaming machine 1 is controlled entirely by means of a microcomputer 25. All of the inputs and outputs, such as pulses in respect of coins, rotatable member monitoring, disc monitoring and buttons, or information regarding the motor for the rotatable members, the disc motor, the lights, the indicators and the pay-out motor, are serially transmitted in order to minimize the number of signal lines. All of the lights are controlled from a multiplexed light matrix, and the displays are also multiplexed. In particular, the microcomputer 25 is responsible for randomly determining the stopping of the rotatable members 2, 3 and 4 and for determining the result in the additional winning game (15, 19), and the microcomputer 25 indicates to the player how the course of his game should proceed by the use of light and sound effects.

The supply unit 26 is responsible for supplying power to the entire gaming machine 1. The required voltages are derived from a mains transformer, rectified and made available to the various assemblies. The microcomputer 25 includes a writing and reading memory (RAM) as the working memory, a permanent



memory (ROM) as the program memory with an integrated random generator, and additional, necessary components such as, for example, buffers, clock generators, shift registers, and the like. In addition, the microcomputer 22 includes a sound generator together with its associated AF amplifier. The motor control 27 supplies the signals necessary for the stepping motors of the rotatable members 2, 3 and 4 – such signals being controlled by the microcomputer 25 – and indicates to the microcomputer 25 the synchronization signals from the members 2, 3 and 4, such signals being received by a unit 28 for detecting and amplifying signals. Furthermore, the motor control 27 is actively connected to the stepping motor of the disc 15. An input/output unit 28 forms the interface for a multiplexed light matrix 29 which actuates all of the lights of the gaming machine 1, even those of the arrow panels 18 of the circle of arrows 17. The control buttons 30 and all of the indicators 31 are actuated by the microcomputer 25, or respectively their signals are supplied to the microcomputer 25. Moreover, an assembly 32, which constitutes the complete coin system of the gaming machine 1, is connected to the microcomputer 25. The assembly 32 serves to adapt the coin pulses to the electronics for further processing, for detecting the number of coins which have been inserted and still exist in the coin storage, and the assembly 32 also supplies the control pulses for the money paying out motors.

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## Patent Claims

1. A coin-operated gaming machine which offers the prospect of a win, comprising a plurality of rotatable members, which are provided with symbols which determine a win or a loss and are associated with display windows, and a microcomputer, fitted with a random generator, for controlling the entire course of the game, **characterized in that**, as further rotatable members, a rotatable disc (15) is provided, which is marked with different winning panels (16), wherein an arrow (19) is oppositely rotatable around the disc (15) around a common axis of rotation, and the same number of snap-in positions are provided for the disc (15) and the arrow (19), and in that, upon the occurrence of a predetermined combination of symbols of the rotatable members (2, 3, 4) in the display windows

(5), the disc (15) and the arrow (19) are rotatable and are stoppable virtually simultaneously by pressing a stop button (24), and then the win, indicated on the disc (15) by the arrow (19), is awarded.

5     2.     The gaming machine according to claim 1, characterized in that the rotary speed of the circular disc (15) is greater than the rotary speed of the arrow (19) pointing to the disc (15).

3.     The gaming machine according to claims 1 and 2, characterized in that the  
10     winning panels (16) of the disc (15), which are disposed adjacent one another in a sector-like manner, are selectively marked with wins in respect of special games or money.

4.     The gaming machine according to claims 1 to 3, characterized in that the  
15     disc (15) is surrounded by illuminatable arrow panels (18) which are associated with the individual winning panels (16) of the disc (15), and in that, in order to simulate the rotating arrow (19), proceeding from an arrow panel (18), which forms a start panel (20), the subsequent arrow panels (18) are illuminatable in succession.

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5.     The gaming machine according to claims 1 to 4, characterized in that the starting panel (20) for the rotational movement of the arrow (19) is selectable, as desired, from the arrow panels (18) by means of a button (23).

25     6.     The gaming machine according to claims 1 to 5, characterized in that, depending on the occurrence of different combinations of symbols of the rotatable members (2, 3, 4) in the display windows (5), a variable number of arrows (19) are illuminated in the arrow panels (18), such arrows (19) simultaneously rotating in a direction opposite to that of the rotating disc (15) due to a step-wise  
30     sequence of illuminating the subsequent arrow panels (18) and, after they and the disc (15) have stopped, the arrows (19) mark a corresponding number of winning panels (16) on the disc (15), wherein the wins indicated by the winning panels (16) are awardable as the total winnings.

7. The gaming machine according to claim 6, characterized in that, when a predetermined combination of symbols occurs, two opposed arrows **(19)** are illuminated in the arrow panels **(18)**.

5

8. The gaming machine according to claim 6, characterized in that, when a predetermined combination of symbols occurs, four arrows **(19)** which are disposed in a cross-like arrangement relative to one another are illuminated in the arrow panels **(18)**.

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4 Pages Drawings

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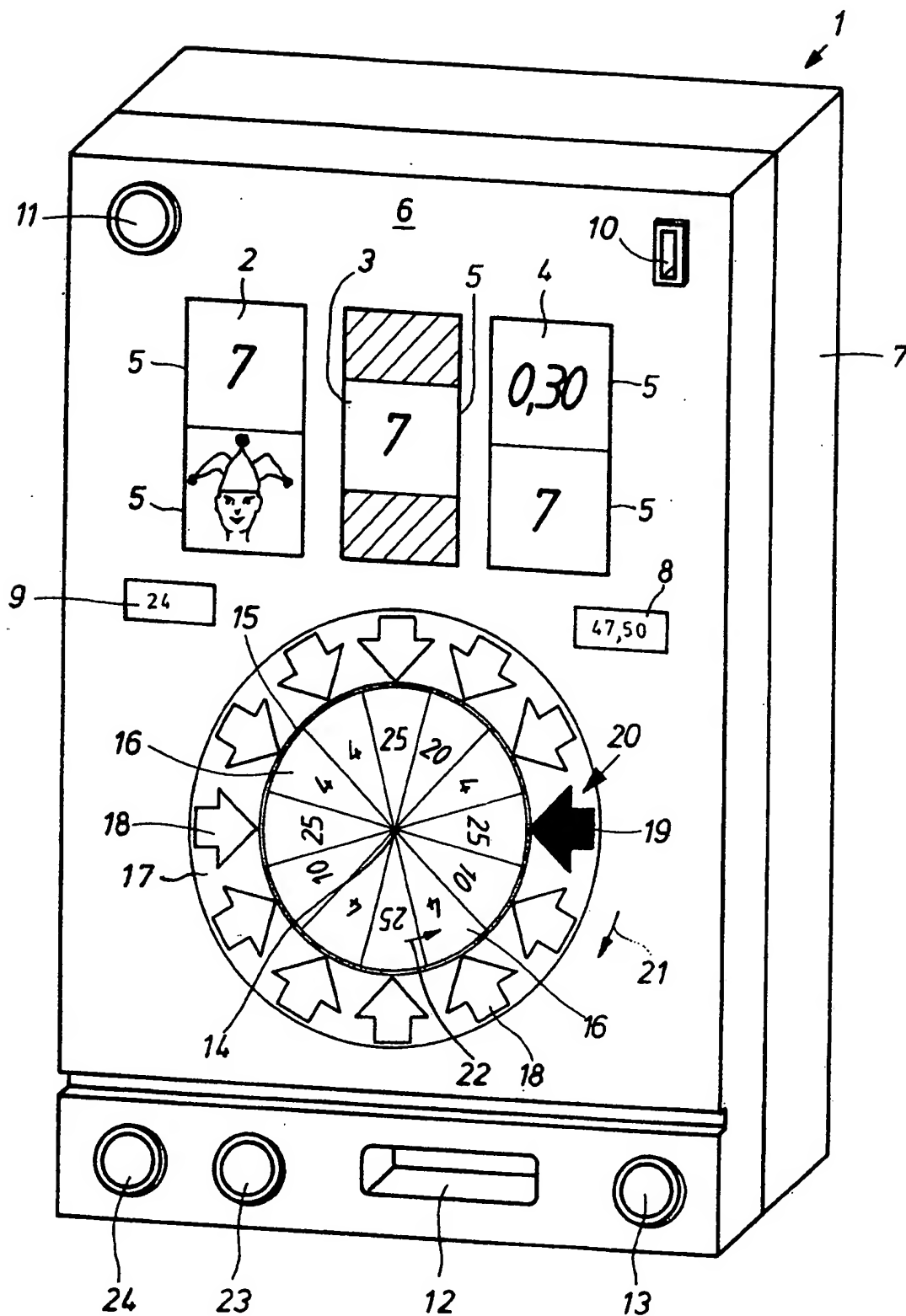
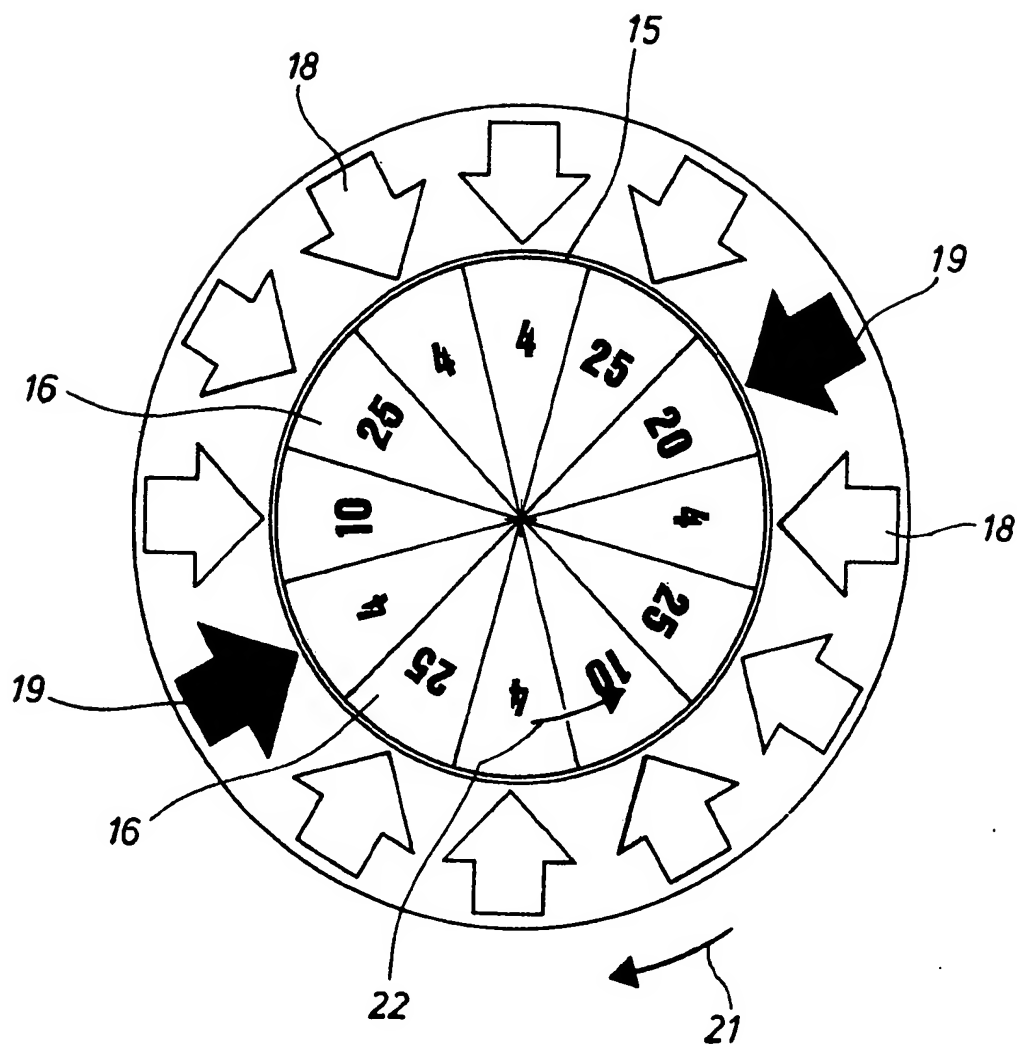
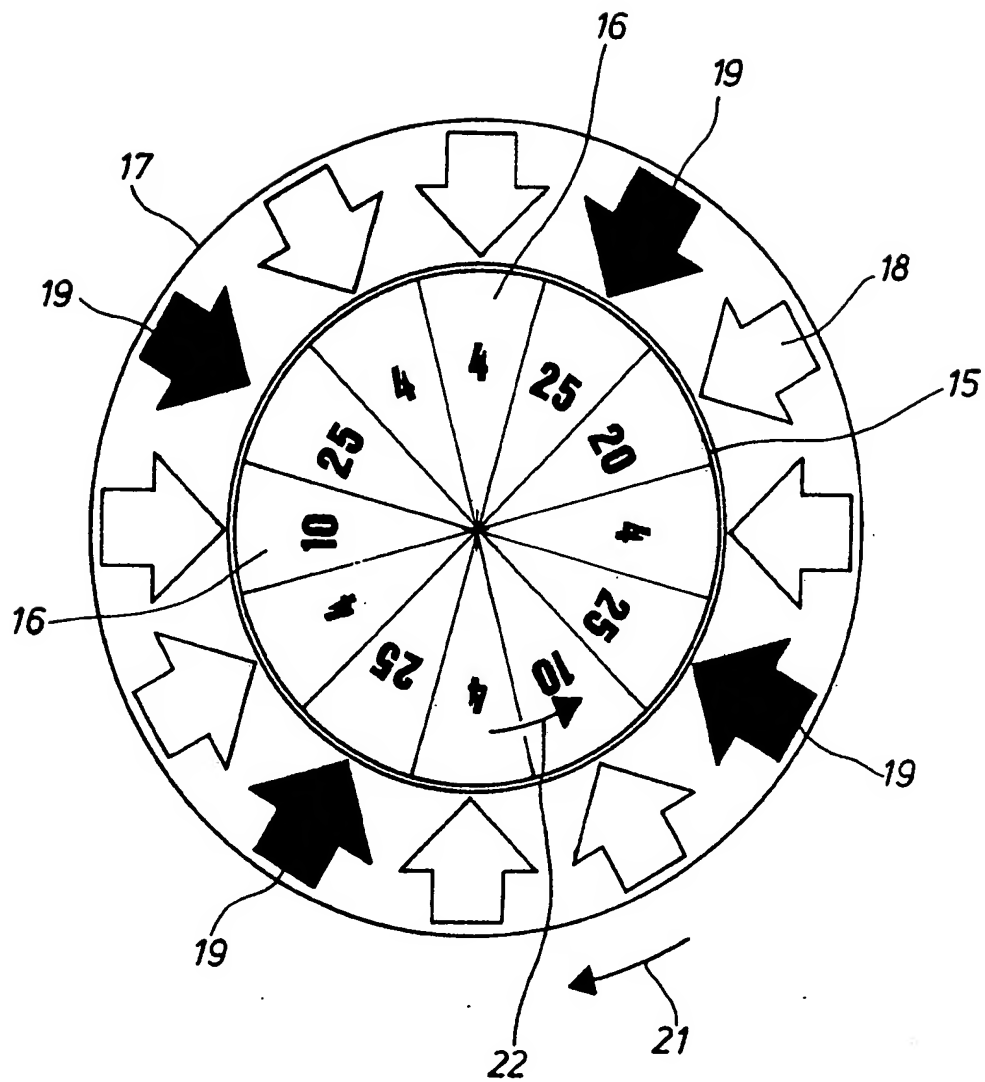


Fig. 1

*Fig. 2*

*Fig. 3*

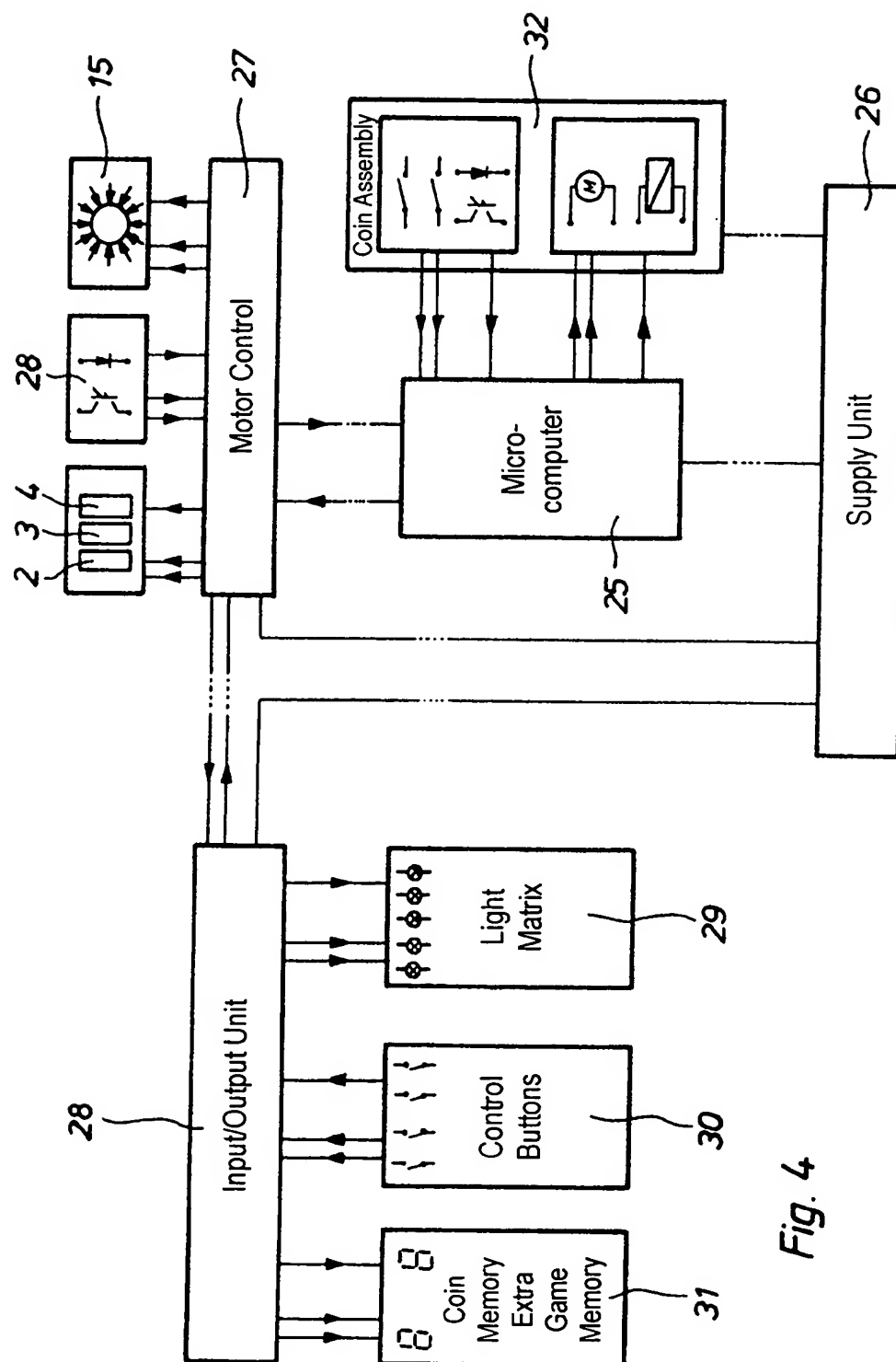


Fig. 4